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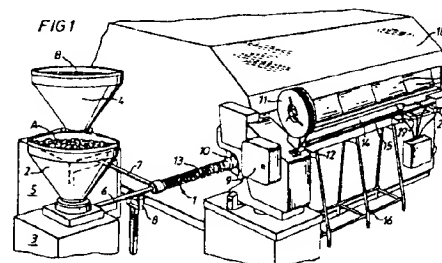
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54 Food product, its manufacture and apparatus therefor.

57 A food product is extruded as an elongate billet (14) from the head (10) of a mandrel (1). The mandrel (1) has inner and outer passages to dispense a solid core (A) (e.g. meat) and a more mobile annular coating (B) (e.g. fat). The product comprises an outer casing (13) of plastics dispensed from the mandrel onto the product as it emerges from the extrusion head.



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This invention relates to the manufacture of a food product of constant cross section with a relatively solid main body or core and a thinner outer layer of less solid, relatively mobile material.

- 5 One exemplary product with which the invention is specially concerned comprises a core of turkey or other meat and a relatively thin outer layer of fat within which the meat is cooked.

10 The mass-production of a food product of the kind set forth above presents a problem owing to the physical dissimilarity between the core and outer layer. The technique of rendering the core

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and outer layer physically homogenous by, for example heating is not appropriate to the food industry.

According to the present invention a method of manufacturing a food product with a relatively solid
5 core and a more mobile outer layer comprises co-extruding the core and outer layer into a casing dispensed from the extrusion head. The casing has a closed end immediately in front of the head before extrusion commences and as the extruded food
10 product advances from the head the casing is carried with it. The casing is a sufficiently close fit on the outer layer to preserve the coherent and even extruded form to provide a product such as would be obtained by the concentric co-extrusion of two physi-
15 cally similar extrudable substances.

When the desired length of product has been extruded the product is cut and the casing closed around the rear end; the means effecting the closure preferably also closes the front end of the casing
20 of the product behind at a position immediately in front of the extrusion head.

Thus the essence of the invention is the dispensing of the casing from the extrusion head to contain the mobile outer layer and this can conveniently

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be contrived by extruding from an elongate mandrel with the casing stock stored around the outer periphery of the mandrel.

The invention will now be described by way of example and with reference to the accompanying drawings wherein:-

Figure 1 is a partially schematic elevation view of an apparatus for putting the present invention into effect;

10 Figure 2 is a side view partly in section of the extrusion mandrel of the apparatus of Figure 1;

Figures 3, 4 and 5 are sections on the lines III - III, IV - IV and V - V of Figure 2;

15 Figure 6 is an elevation of the extrusion head of the mandrel;

Figure 7 is a view of the extrusion head with a casing prior to closure and emerging extruded food product;

20 Figure 8 is a view similar to Figure 7 showing the meat product having advanced a short distance with the casing closed;

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Figure 9 is a section of the food product on the line IX - IX of Figure 8; and

Figures 10, 11 and 12 are schematic plan views illustrating how a food product in the form of an elongate billet leaves the mandrel and is discharged into a freezing tank.

Referring initially to Figure 1 of the drawings the apparatus illustrated comprises an extrusion mandrel 1 fed with turkey or other meat A from a first hopper 2 by a vane pump in housing 3 and with liquified fat material B from a second hopper 4 by a vane pump in housing 5. The meat is raw and deboned and preferably mechanically massaged with salt to produce salt-soluble proteins which enhance the bending properties of the meat. Pipes 6 and 7 extend from the hoppers 2 and 3 respectively to the central passage and the surrounding annulus of mandrel 1 as will be described with reference to Figures 2 to 5. Pipe 6 is supported by stand 8. A cutting, closing and clipping apparatus 9 is positioned over the extrusion head of mandrel 1 and has a reel 11 dispensing clipping stock 12. Thin, approximately 20 microns, tubular casing stock 13 of non-toxic transparent plastics is threaded on to the mandrel 1.

A tiltable track 15 supported on legs 16 receives the elongate cased billet 14 extruded from mandrel 1.

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When finally discharged billet 14 is tipped sideways through flaps 17 into a freezing tank 18. This tipping and the necessary starting and stopping of the extrusion process, as will be described subsequently with reference to Figures 10 to 12, is effected by
5 microswitches 19 and 20.

The detailed construction of the extrusion mandrel 1 will now be described with reference to Figures 2 to 5 of the drawings.

The elongate extrusion mandrel 1 has inner
10 and outer concentric sections 20 and 21 of circular cross section. The inner section 20 provides the totally unobstructed passage necessary for the passage of turkey meat A which is solid in consistency often comprising large natural pieces. An
15 axial inlet 25 at the rear end of the inner section 2 allows the entry of this meat from pipe 6 (see Figure 1). The mandrel outer section or casing 21 defines with the inner section 20 an annular space 22 through which the mobile fluid fat B forming the
20 outer layer of the food product flows. A radially extending pipe 23 at the rear end of the mandrel 1 provides an inlet for the fat from pipe 7 (see Figure 1). As can well be seen from the sectional views vanes 24 connect the inner and outer sections

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20 and 21.

The extrusion head 10 is formed by the laterally enlarged front end part of the mandrel and is seen in section in Figure 2. The space 22 is constricted here to define an annular frontwardly facing extrusion orifice 26. The main length of the space 22 through which the fat flows is relatively wide to allow free flow of the fat which, though fluid, may be quite viscous especially in the cool ambient conditions usual in the food industry. The frontwardly facing extrusion orifice 27 of passage 20 is by contrast of enlarged area to allow the meat some degree of physical relaxation before it enters its casing.

15 The operation of the apparatus will now be described with reference to Figures 6 to 12 of the drawings.

20 The extrusion head 10 of the mandrel 1 is shown empty in Figure 6. On activation of the extrusion pumps the extrusion product comprising the core of meat A and annular outer layer of fat B advances to the front end of the mandrel 1 into the extrusion head 10. This can be seen in Figure 7. The tubular casing 13 is pulled forward a short distance by

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hand from the front end of the mandrel and the apparatus 9 operated to draw the casing 13 around the front of the emerging billet 14 and to secure the casing with a front clip 28. This position is

5 illustrated in Figure 8 and it will be noted that with the advance under extrusion pressure of the meat and fat the billet end part 29 becomes rounded. It should be noted that the dimensions of the extrusion head, i.e. the diameters of central orifice 27 and

10 the width of annular passage 26 are those of the billet 14 and the ultimate food product, this being a true extrusion. The casing 13 preserves this extruded configuration. Figure 9 shows the cross section of the billet and the food product.

15 Referring now to Figure 10 the extruded billet 14 with the closed and rounded front end part 29 leaves the extrusion head 10 and apparatus 9 and travels along the track 15 in the direction x towards the microswitches 19 and 20. When the front

20 end part of the billet 14 contacts and closes the first microswitch 19 extrusion ceases and the apparatus 9 operates to form, close and clip the rear end of the billet 14 and the front end of the billet immediately behind. The billet then resumes

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its advance driven by means on track 15 to close the second microswitch 20 which operates to tilt the track sideways in the direction of arrows y thereby tipping the billet through flap 17 into freezing
5 tank 18. The billets move transversely of their length through tank 18 and are retrieved frozen for cutting to the desired length and any packaging required.

It should be appreciated that the billet 15
10 as discharged from the extruder is, in principle, a food product in itself suitable for slicing and cooking. The casing 14 remains on the product right through storage, sale and cooking to the plate. The freezing operation envisaged above could thus be
15 supplemented or replaced by a cooking, smoking or other preparation.

It should be re-emphasised that although the invention has been described by way of example with reference to turkey meat it is applicable to any kind
20 of solid raw meat.

The transparent non-toxic casing stock may be of any suitable "skin" material typically of cellulose, polyamide or polyester. One suitable polyester casing material is sold under the Trade Mark
25 NALOPHAN.

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CLAIMS

1. A method of manufacturing a food product with a relatively solid core and a more mobile outer layer comprising co-extruding the core and outer layer into a casing dispensed from the extrusion
5 head, the casing having a closed end immediately in front of the head so that the extruded food product carries the casing with it.
2. A method as claimed in Claim 1 wherein when the desired length of product has been extruded
10 the product is cut and the casing closed around the rear end, the means effecting the closure also closing the front end of the casing of the product behind.
3. A method as claimed in either Claim 1 or
15 Claim 2 wherein the product is dispensed as an elongate billet which is subsequently frozen and cut to lengths for sale.
4. A method as claimed in any of the preceding claims wherein the core material and the mobile

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material are fed respectively into the unobstructed central passage and outer annulus of an extrusion mandrel and casing stock is threaded onto the mandrel.

- 5 5. A method as claimed in Claim 4 wherein at the extrusion head the outer annulus is of reduced width and the inner passage of enlarged diameter thereby to extrude the product forwardly into the case.
- 10 6. Apparatus for carrying out the method of Claim 1 comprising an extrusion mandrel (1) fed with core material A from a container (2) and with coating material B from container (4), an end forming and securing device (9) and a track (15) for receiving an elongate extruded and cased billet 15 extruded from the mandrel.
- 20 7. Apparatus as claimed in Claim 6 wherein the mandrel (7) is formed of inner and outer concentric members (20) and (21) the passage defined within the inner member (10) being free of obstruction to

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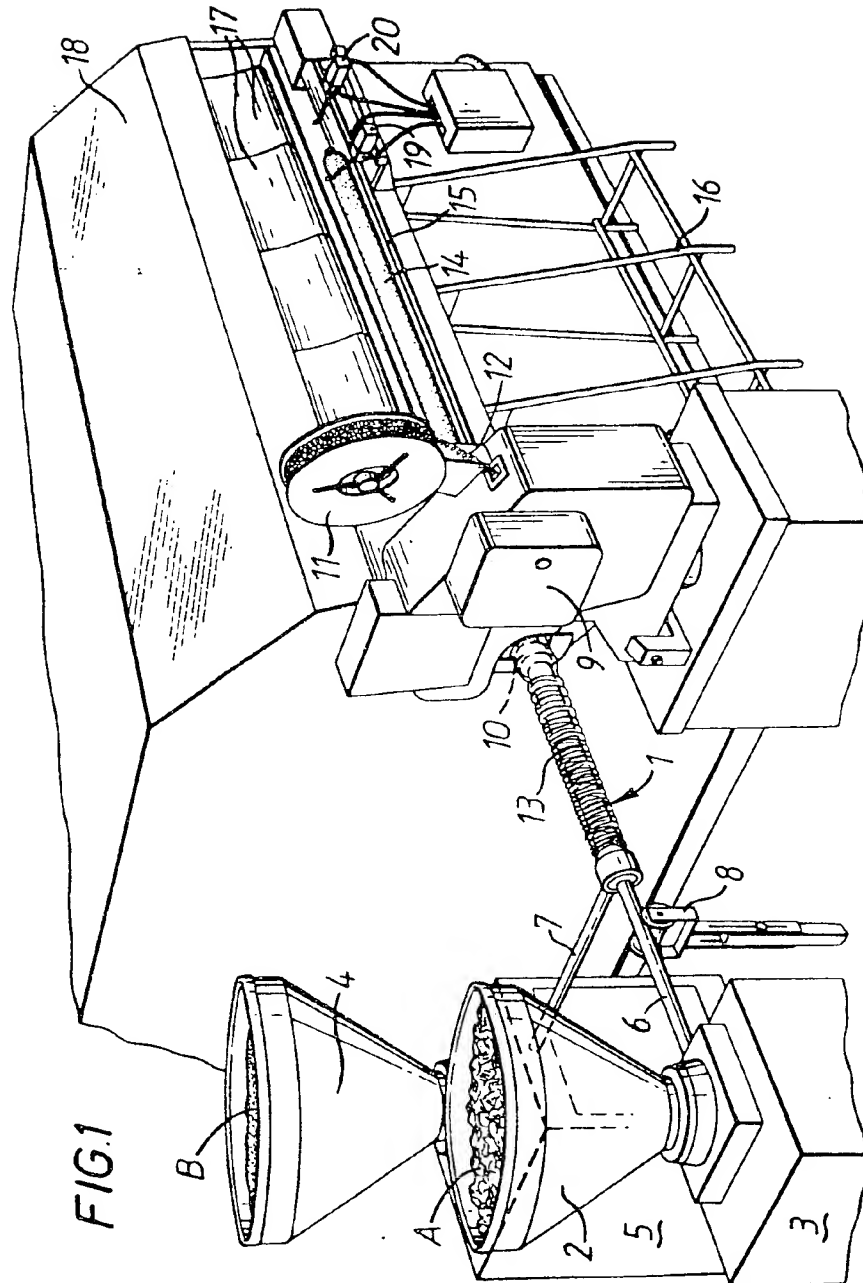
allow the passage of relatively solid core material.

8. Apparatus as claimed in Claim 7 wherein the mandrel has an extrusion head (10) of enlarged diameter the annular extrusion orifice (26) for the outer coating being narrowed and the orifice (27) for the core being made wider.

9. Apparatus as claimed in any of Claims 6 to 8 including means put into operation by the advancing billet 15 for actuating the securing device 9 and for tilting the track to discharge the billet.

10. A food product made by a method as claimed in Claim 1 or on the apparatus as claimed in Claim 6.

11. A food product formed by the coextrusion of a compacted core of raw meat A and an outer annulus of mobile fluid fat B into an outer casing of a non-toxic plastics material.



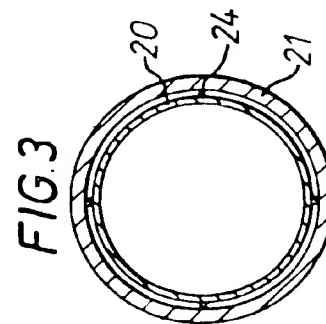
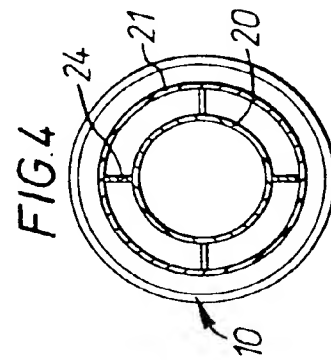
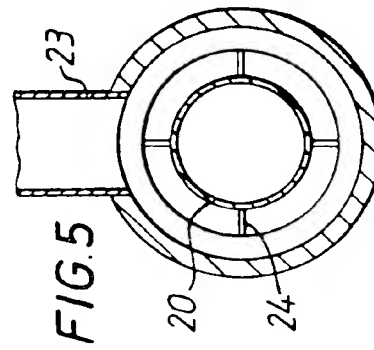
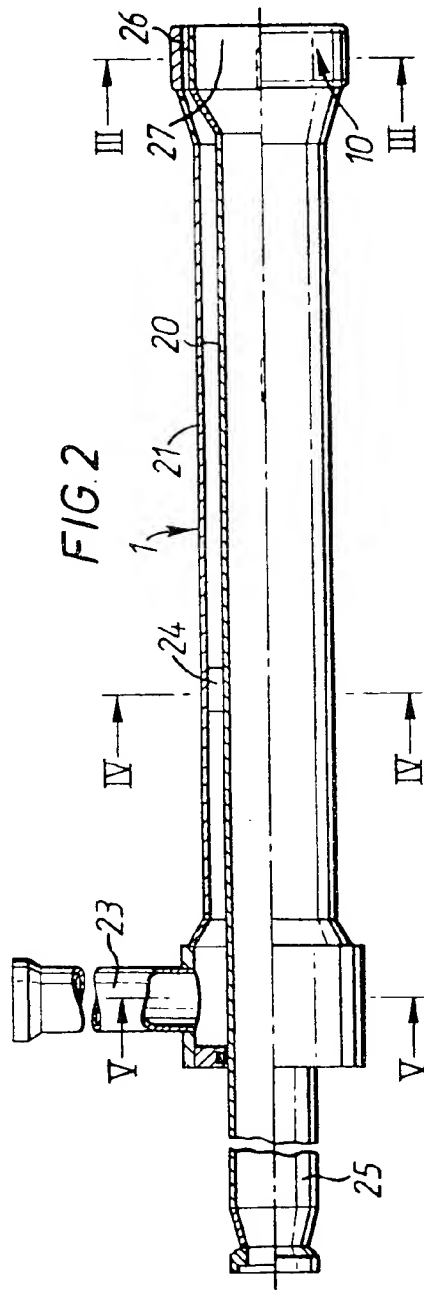


FIG. 6

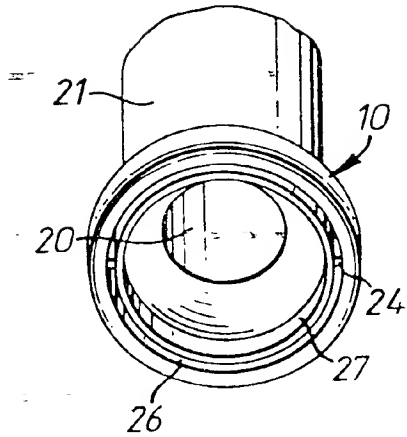


FIG. 7

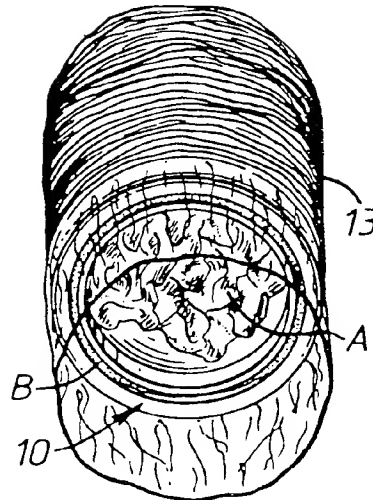


FIG. 8

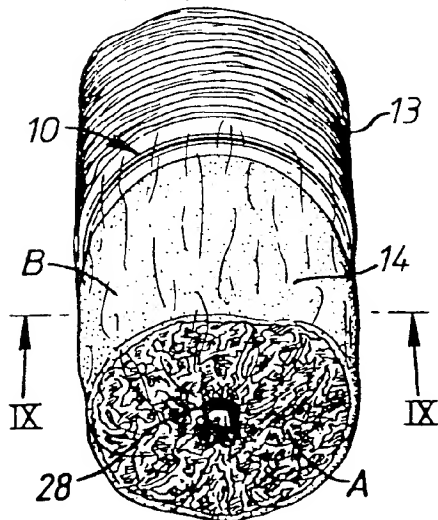
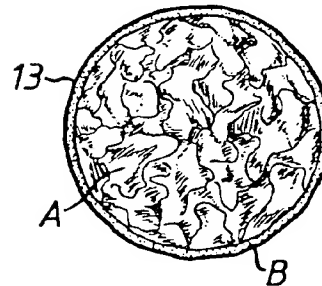
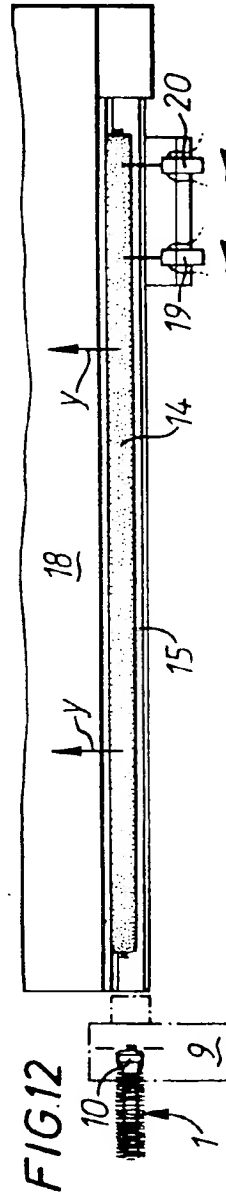
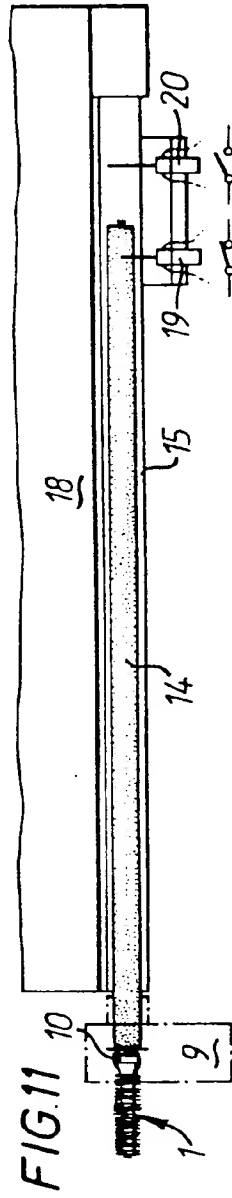
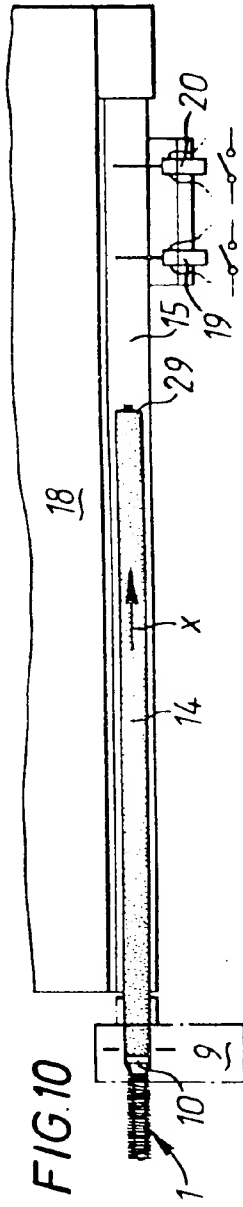


FIG. 9







European Patent
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EUROPEAN SEARCH REPORT

0024790

Application number

EP 80 30 1947

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>DE - A - 2 304 799</u> (W. HENNING) * Claims 1,3,5; page 2, paragraph 1; page 2, paragraph 3 - page 3, paragraph 1; figures 4,5 *	1,2,4, 6,7, 10,11	A 23 P 1/00 A 22 C 11/02
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X	<u>US - A - 3 399 423</u> (E. KIELSMEIER et al.) * Claim 1; column 2, lines 30-35; columns 8-12; figures 1-10 *	1-8,10	
	--		TECHNICAL FIELDS SEARCHED (Int. Cl.)
	<u>US - A - 3 698 916</u> (S. MORELAND) * Claim 1; column 2, line 1 - column 3, line 31; figures *	1,2,6, 10,11	A 23 P 1/00 A 22 C 11/02 A 23 L 1/31
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P	<u>EP - A - 0 004 502</u> (W. SAURIN) * Claims 1,12,13; page 6, lines 7-36; figure 2 *	1,2,4, 6,7,10	
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A	<u>US - A - 3 892 009</u> (R. TOWNSEND) ----		CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
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